86074

S/180/60/000/005/015/033
E193/E183

Investigation of the Titanium-Chromium-Aluminium Alloys by Bending Tests at Elevated Temperatures

after which they were machined to 4 mm diameter. The bending tests of 2, 5, 10, 25, 50, 100 and 300 hours' duration were carried out at 400 and 500 °C, the applied stress being 40 and 15 kg/mm^2 respectively; the magnitude of deflection of the test pieces was taken as a comparative measure of the strength of the alloys studied. The maximum resistance to deformation was displayed by a narrow range of alloys of the pseudo-binary system with the Cr:Al ratio of 1:9, containing 8-12% Al and 0.88-1.32% Cr, and constituting super-saturated α-solid solutions with a heterogeneous microstructure. In the case of these alloys, the deflection after 100 hour tests at 500 °C amounted only to 1.5 mm. The resistance to deformation of heterogeneous alloys of the two other pseudo-binary systems (with the Cr:Al ratios of 1:1 and 3:1) was very low at 550 °C, it improved at 400 °C but was still lower than that displayed by the alloys discussed in the previous paragraph, at 550 °C, the minimum deflection (obtained

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Investigation of the Titanium-Chromium-Aluminium Alloys by Bending Tests at Elevated Temperatures

in alloys with a eutectoid structure) after 50 hours' test being about 5 mm. The work was done in the Institut metallurgii imeni A.A. Baykova (IMET) Akademii nauk SSSR (Institute of Metallurgy imeni A.A. Baykov of AS USSR) under the direction of I.I. Kornilov.

There are 4 figures and 4 references: 3 Soviet and 1 non-Soviet.

SUBMITTED: January 9, 1959

Card 3/3

MIKHEYEV, Y.S.

Some sources of error in the measurement of temperature by means of thermoccuples. Zav.lab. 26 no.5:646 '60.
(MIRA 13:7)

1. Institut metallurgii Akademii nauk SSSR.
(Temperature--Measurement) (Thermocouples)

25057
S/080/60/033/010/006/029
D216/D306

152240

AUTHORS: Aleksashin, V.S., and Mikheyev, V.S.

TITLE: Study of the physico-chemical properties of alloys of the system $CrSi_2$ — $MoSi_2$

PERIODICAL: Zhurnal prikladnoy khimii, v. 33, no. 10, 1960, 2216 - 2222

TEXT: The aim of the present work was to study the melting points, microstructure, electrical resistivity, hardness, microhardness and heat resistance of alloys of the system $CrSi_2$ — $MoSi_2$. The bi- silicides were prepared from the pure raw materials by melting in a H.F. furnace using a double corundum crucible, under a flux consisting of CaO (46 %) Al_2O_3 (47.7 %) and MgO (6.3 %) to prevent oxidation. Actually a certain amount of oxidation was unavoidable, - 3 - 5 % of the Si and 5 - 7 % of the Mo was lost in this manner, with alloys of up to 70 % $CrSi_2$. Electrical resistivity and melt-

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D216/D306

Study of the physico-chemical ...

ing point determinations were carried out on small rod samples. The melting points were determined with the optical pyrometer OP-48 and the use of a graduated curve constructed from the mp.s of the pure metals Ni, Fe, Zr, Nb and Mo. The microstructure was studied on specimens in annealed and hardened conditions. The specimens were etched in 10 % oxalic acid by electrolysis at a c.d. of 1 - 2 a/cm^2 for $CrSi_2$ - rich specimens, and in 'plavikovoy acid + ethanol (in the proportion of one volume to two volumes). Photographs show the microstructure of the hardened alloys of the system $CrSi_2$ — $MoSi_2$ x 320. In the range of compositions 55 - 80 % $MoSi_2$ the alloys have a heterogeneous microstructure consisting of what has been provisionally designated α- and β-grains. The microhardness was measured with the PMT-3 instrument using a load of 50 gr. $MoSi_2$ has a higher microhardness than $CrSi_2$. The hardness of the hardened alloys was measured on a Vickers hardness machine with a 5 kg load. The heat resistance of 20, 50 and 80 % $MoSi_2$ alloys was studied as

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Study of the physico-chemical ...

well as that of the bisilicides of Cr and Mo. This was carried out at 1200° by estimating the weight increase on oxidation for 200, 300 and 500 hours' exposure. The authors conclude: 1) A constituents graph of the $CrSi_2$ — $MoSi_2$ system has been established. Alloys of this system form a limited series of solid solutions: The heterogeneous region consisting of the α and β-phases extends from 35 to 80-85 % $MoSi_2$. 2) The microhardness of the α-solid solution varies from 960 to 1120 kg/mm^2 and of the β-solid solution from 1260 to 1500 kg/mm^2. 3) Alloys with 10 % $MoSi_2$ (α-solid solution), 95 % $MoSi_2$ (β-solid solution) and 60 % $MoSi_2$ (center of the heterogeneous region α + β) have the maximum hardness. 4) Electrical resistivity of the 7.5 % $MoSi_2$ alloy is 15.540 Ω mm^2/M. The lowest resistivity is 0.266 Ω mm^2/M, approximating to $MoSi_2$ in chemical composition. 5) Alloys of the β-solid solution have the highest heat resistance. The weight gain of $MoSi_2$ is 25 times less than

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25057
S/080/60/033/01[illegible]
D216/D306

Study of the physico-chemi[illegible] ...

that of $CrSi_2$. Alloys based on $MoSi_2$ with $CrSi_2$ con[illegible] 1[illegible]
5[illegible] % show interest as a heat-resistant material. Th[illegible] 5[illegible]
re[illegible], 5 tables and 4 references: 1 Soviet-bloc and 3 [illegible]
bloc. The reference to the English-language public[illegible]
follows: R. Kieffer and F. Benesovsky, Silicides of the [illegible]
metals of the 4th, 5th and 6th groups of the periodic tab[illegible],
don, 1955.

SUBMITTED: March 20, 1960

Card 4/4

188100 1413, 1418, 2808 25510

S/078/61/006/008/009/018
B127/B220

AUTHORS: Mikheyev, V. S., Belousov, O. K.

TITLE: Melting-point diagram of the system titanium-zirconium-niobium

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 8, 1961, 1905-1908

TEXT: Since, according to the literature mentioned, the fusibility of the systems titanium-zirconium and titanium-niobium has already been studied, the system titanium-zirconium-niobium was investigated by the authors. The surface of the solidus was studied by using the contact method and an optical pyrometer. The alloy was prepared from 99.34% titanium and 99.5% zirconium and niobium iodide in an electric-arc furnace in argon atmosphere. Based on data in the literature, the melting temperatures were supposed to be 1660°C for titanium, 1845°C for zirconium, and 2410°C for niobium. The results obtained by thermal analysis of the alloys are shown in a table. Particularly titanium and zirconium showed a marked effect on the melting point of the alloy. The ternary alloy Ti-Zr-Nb containing more than 30% of niobium melts at higher temperatures than a binary system of the same niobium content, since this part of

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Melting-point diagram... 25510

the solidus shows a bend the maximum of which is shifted in the direction of the system titanium-niobium. The latter system also has a steeper rise of the melting temperature with varying composition than the system zirconium-niobium. Fig. 1 shows the isotherms on the surface of the solidus of Ti-Zr-Nb. A steric representation of the diagram of the solidus of Ti-Zr-Nb is shown in Fig. 6. There are 6 figures, 1 table, and 13 references: 7 Soviet-bloc and 6 non-Soviet-bloc. The three most important references to English-language publications read as follows: B. A. Rogers, D. F. Atkins, J. Metals, 7, No. 9, 1034 (1955). R. F. Domogala, D. I. McPherson, J. Metals, 2, 619 (1956). P Duwez J Inst. Metals, 80, 525 (1952).

Table: Results obtained by thermal analysis of the alloy Ti-Zr-Nb.

Legend: (1) % by weight; (2) melting temperature, °C; (3) section.

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S/136/62/000/004/003/004
E193/E383

18.1285

AUTHORS: Mikheyev, V.S. and Poplaukhin, A.S.

TITLE: Effect of cold deformation and annealing on the mechanical properties of commercial-grade titanium

PERIODICAL: Tsvetnyye metally, no. 4, 1962, 64 - 69

TEXT: The object of the present investigation was to study the effect of deformation in cold-rolling, and annealing time and temperature on the mechanical properties of commercial-grade titanium, T[illegible] (TG-0), containing the following impurities (%): 0.04% C, 0.12% Fe, 0.03% Si, 0.10% O_2, 0.06% N_2 and 0.008% H_2.

The preliminary treatment consisted of rolling the material to sheet, 2.33 and 12 mm thick, and then annealing it at 600 °C. After annealing, the metal was cold-rolled at a rolling speed of 15 m/min until evidence of edge cracking was observed, the direction of the cold-rolling being always parallel to the direction of hot-rolling. The maximum degree of deformation attained was 80 - 85%. The mechanical properties (UTS, yield point, elongation and reduction in area) were determined on

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S/136/62/000/004/003/004
E193/E383

Effect of cold deformation, ...

specimens cut in a direction parallel, normal and at 45° to the direction of rolling. The cold-rolled material was annealed at 650 °C for 30, 90 or 210 min and cooled in air. The most significant results are reproduced in Fig. 3, where σ_B (UTS), σ_S (yield point) and δ (elongation) are plotted against the degree of cold plastic deformation (reduction in thickness η = H-h/H.100%), graph a relating to material cold-rolled at 20 °C, graph ξ to specimens annealed for 90 min at 650 °C. These and other results can be summarized as follows. 1) The cold-workability of Ti, expressed as the reduction in thickness corresponding to the appearance of the first edge crack in flat rolling, was 80 and 87.5% for strip 2.35 and 12 mm thick, respectively. The UTS of the specimens given these reductions was 89.2 and 95.2 kg/mm^2, respectively, the decrease in elongation after these reductions being 76 and 40%, respectively. 2) Cold-worked Ti was anisotropic in respect of all the mechanical properties studied. Anisotropy of elongation and reduction in area persisted after annealing

Card 2/4

Effect of cold deformation ....

and was most pronounced in thin specimens. 3) The UTS of specimens annealed for 30 min at 650 °C was practically independent of the degree of preliminary cold plastic deformation and equal to that of undeformed material. The plastic properties of annealing specimens increased with increasing degree of preliminary deformation. Thus, for instance, elongation, measured in the direction of rolling, was about 52% for undeformed material and about 55% for material given 80% reduction and annealed for 30 min at 650 °C. The δ/η curves for specimens annealed under these conditions and tested in the direction normal to and at 45° to the direction of rolling had a minimum at η = 30%; this was attributed to the excessive grain growth after this degree of deformation. 4) Very high plastic properties can be attained by heavy plastic deformation followed by annealing. In the case of strip 2.33 mm thick given 80% reduction, values of δ = 47, 58 and 56.5% were obtained on specimens tested in the direction parallel, normal and at 45° to the direction of rolling,

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S/180/62/000/005/007/011
E040/E435

AUTHORS: Mikheyev, V.S., Chernova, T.S. (Moscow)

TITLE: Effect of aluminium on the mechanical properties of titanium alloys

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no.5, 1962, 139-142

TEXT: Results are reported of an investigation of the effect of aluminium contents from 1 to 12% on the mechanical properties of Ti-Al and Ti-Al-Cr-Fe-Si alloys. At Al contents up to 7.5% by wt, the strength of both alloys was found to increase and pass through a maximum corresponding to an aluminium content of about 7%. The strength of the alloys drops sharply at higher aluminium contents and, in addition, the brittleness of both alloys rises, presumably because of the formation of new phases. The Ti-Al alloys were found to possess a considerable reserve of ductility and, for this reason, an examination was made of Ti-Al-Cr-Fe-Si alloys which were hoped to have improved strength and heat-resistance properties at a still satisfactory level of ductility. The overall addition of these elements was 1.6% by wt. (solubility

Effect of aluminium ...

limit of the elements in the corresponding binary and ternary solutions). The mechanical strength data obtained in tests on specimens annealed for 25 minutes at 750°C are tabulated. The strength of Ti-Al-Cr-Fe-Si alloys was found to rise with rising aluminium contents up to 7.5 to 9% by wt, pass through a maximum and then drop sharply thus resembling the general pattern of strength variation of the binary Ti-Al alloys but, in this case, the strengthening effect caused by aluminium addition is much more pronounced. The ductility of the quinary alloy (cross-section area reduction and elongation) was found to drop at first as the Al content is increased to 7.5% and then remain constant up to Al contents of 9.5%. There are 2 figures and 2 tables.

SUBMITTED: March 11, 1962

Card 2/2

S/598/62/000/007/007/040
D267/D307

AUTHORS: Mikheyev, V. S. and Chernova, T. S.

TITLE: Solubility of chromium in α-titanium and the mechanical properties of the binary titanium-chromium system

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 68-73

TEXT: Ti-Cr alloys with 0.2, 0.3, 0.4, 0.75, 1 and 2% Cr were prepared by levitation melting. The solubility of Cr in α-Ti as determined by investigating the microstructure and hardness of the alloys was found to amount to 0.2 wt-% at 800°C, 0.55 wt-% at 650°C and 0.35 wt-% at 450°C. The results of investigation of the mechanical properties of Ti-Cr alloys (up to 20% Cr) point to this system being likely to be useful in the development of alloys with good strength and plastic properties. There are 6 figures and 1 table.

Card 1/1

S/598/62/000/007/010/040
D244/D307

AUTHORS: Mikheyev, V. S. and Chernova, T. S.

TITLE: Phase diagram for ternary titanium-chromium-vanadium system

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 81-88

TEXT: The object of the present work was to study phase equilibria of the Ti corner in ternary system Ti-Cr-V, with the total content of Cr + V equal to 60%. The starting materials were 99.8% Ti [illegible] (TG00), 98% V and electrolytic Cr. A tendency was observed for the lowering of the solidus surface, in the triangular diagrams, towards the middle part of binary system Ti-Cr. Alloys melting at the highest temperatures (1800 - 1850°C) were close to V-Cr side. Differential thermal analysis of the solid alloys revealed thermal effects close to the Ti-Cr side, corresponding to phase transformation $\alpha + \sigma \longrightarrow \beta$. Ti-Cr-V alloys with a high content of Cr under-

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Phase diagram for ternary ...

went ß-phase transformation on cooling with the formation of α- or γ-surplus phases. Transition $\alpha + \gamma \longrightarrow$ ß-solid solution gave a heat effect on heating which increased with the quantity of the eutectoid in the alloys, whilst the temperature of the eutectoid transition decreased. Analogous thermograms were obtained for alloys in the section Cr:V = 3:1 and several alloys in the section Cr:V = 1:1. Studies of the alloy microstructure and hardness established the existence of solid solutions of Cr and V in the α- and ß-modifications of Ti, solid solutions based on $TiCr_2$, regions composed of α + ß, $\alpha + \gamma$, γ + ß phases and a region composed of α + ß + γ phases. Isothermic sections were constructed for Ti-Cr-V system at 1200°, 1000°, 800° and 600°C as well as two polythermic sections with the ratio of Cr:V of 9:1 and 3:1. At 1200°C there was a ß-solid solution based on Ti and a phase corresponding to solutions with a martensitic structure. Alloys with a higher concentration of V and Cr had polyendric structure. A narrow region composed of ß + γ phases extended from 30% Cr down to the Ti-Cr side of the triangular diagram. At 800°C α-solid solutions appeared in the Ti corner of the diagram as well as α + ß-solid solutions passing from

S/598/62/000/007/010/040
D244/D307

Phase diagram for ternary ...

the Ti-V side towards that of Ti-Cr. At 600°C there was a small region of α-solid solution of Ti, β-solid solution of Ti passed from the side of Ti-V (20% V) into the triangle, β + δ phase became narrower and the α + β region widened. The boundaries of region α + β + δ were not determined accurately. There are 9 figures.

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S/598/62/000/007/015/040
D244/D307

12 1285

AUTHORS: Mikheyev, V. S. and Markovich, K. P.

TITLE: Mechanical properties of the alloys based on α-solid solutions of titanium in the titanium-aluminum-zirconium system

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 114-119

TEXT: The authors investigated the properties of ternary alloys Ti-Al-Zr in the regions of three radial sections with the ratios of Al:Zr = 1:3, 1:1 and 3:1. It was shown that for the increasing alloying of α-Ti solid solution with Al and Zr, the tensile strength and heat resistance of the alloys increased and their plasticity decreased. The highest tensile strength between 20 - 650°C was given by the alloy with the concentration of Al + Zr = 18% lying in the section 1:1. Alloying with 0.5% - 7% Zr of the six-component system Ti-Al-Cr-Fe-Si-B, containing 6% and 7.5% of Al and Cr + Fe + Si =

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Mechanical properties of ...

1% to 1.2%, increased the tensile strength and heat resistance of the alloys between 20 and 650°C. The alloys containing 7.5% Al and 7% Zr had the highest tensile strength. The alloy having the highest heat resistance contained 7.5% Al and 6% Zr. There are 6 figures and 1 table.

Card 2/2

3 [illegible]

S/598/62/000/007/016/040
D290/D307

12 1285

AUTHORS: Kornilov, I. I., Mikheyev, V. S. and Belousov, O. K.

TITLE: The main properties of solid solutions with an α-titanium base at -196°C

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 120-126

TEXT: Properties of alloys derived from three ternary systems with an α-Ti base were studied in continuation of earlier studies of ternary Ti systems by one of the authors, and was motivated by the lack of systematic information about Ti alloys at low temperatures. The authors studied Ti-Zr-Mo, Ti-Zr-V, and Ti-Zr-Nb systems containing 1.3 atomic percent of Zr and variable amounts (up to 5 atomic percent) of the third component. Phase diagrams in the region of the polymorphous transformation were constructed using microstructural and thermal analyses and electrical resistance measurements. Mechanical properties of the α-solid solutions were studied; the

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The main properties ...

Optimum compositions of alloys with high impact strengths at -196°C were found (20 kg/cm^2). The results were used to develop an alloy [illegible] (AT2) that has a high impact strength at -196°C and reasonable strength (60 - 80 kg/mm^2) at room temperature. Previous results for the ternary α-solid solutions of the systems Ti-V-Mo, Ti-Nb-V, and Ti-Nb-Mo were used to synthesize alloys with high impact strengths at -196°C.(8 - 14 kg/cm^2). There are 6 figures.

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S/598/62/000/007/015/040
D290/D307

12 1285

AUTHORS: Kornilov, I. I., Mikheyev, V. S., Pylayeva, Ye. N., Volkova, M. A., Borok, B. A., Shchegoleva, R. P. and Golubeva, L. S.

TITLE: The effect of aluminum on the structure and properties of a Ti-Al-Cr-Fe-Si-B alloy prepared by powder metallurgy

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 130-134

TEXT: The authors studied the effect of varying amounts of Al in Ti-Al alloys (1 - 7% by weight Al) and in alloys of the Ti-Al-Cr-Fe-Si-B system (1.5 - 12% by weight Al) on the structure and properties of the alloys. Strength of the Ti-Al alloys increased from 77.2 to 107-3 kg/mm^2 as the Al content rose from 0 to 7%; the strength of alloy AT4 (AT4) increased from 104 to 142 kg/mm^2 as the Al content rose from 1.5 to 10%. Plasticities of the alloys decreased and the heat resistance of AT4 increased as the aluminum

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S/598/62/000/007/015/040
D290/D307

contents became higher. The rate of oxidation of AT4 in air at 700°C decreases by about 60% as the Al content rose from 5 to 12% by weight. There are 4 figures and 4 tables.

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S/598/62/000/007/020/040
D290/D307

AUTHORS: Kornilov, I. I., Mikheyev, V. S., Chernova, T. S. and Markovich, A. P.

TITLE: The basic properties of titanium alloys AT3 (AT3), AT4 (AT4), AT6 (AT6) and AT8 (AT8)

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 140-149

TEXT: Properties of the above alloys, which are related to the system Ti-Al-Cr-Fe-Si-B were studied; the Al content varied from 2.5 to 7.5% by weight while the total Cr, Fe, Si and B content was in the range of 1.0 - 1.8%. The alloys can be melted under works conditions in vacuum arc furnaces and are subjected to the same forging, rolling and hot working processes as all standard and experimental Ti alloys. A section of the phase diagram was constructed from the results of thermal and microstructural analyses and measurements of the temperature of the solidus. Mechani-

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S/595/62/000/007/020/040
D290/D307

The basic properties ...

cal properties were comprehensively measured and their limits found for many specimens; the properties of industrially produced alloy specimens were found to be within these limits. Temperature variations of the mechanical properties, long-run strengths, creep and elasticity moduli of the alloys were measured in the range 20 - 650°C. There are 6 figures and 8 tables.

/B

Card 2/2

S/598/62/000/007/025/040
D217/D307

18 12 73

AUTHORS: Kornilov, I. I., Mikheyev, V. S. and Chernova, T. S.

TITLE: Thermal stability and change in properties of titanium alloys AT3 (AT3), AT4 (AT4), AT6 (AT6) and AT8 (AT8) during ageing

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 185-190

TEXT: Thermal stability of the above alloys, after soaking for 100 hours at 400, 450 and 500°C, was determined by the change in mechanical properties and microstructure of the alloys before and after ageing. Ageing was studied on specimens received from laboratory and experimental production melts, the ingots being 1.2, 20, 50 and 400 kg in weight. All ingots were melted in vacuum arc furnaces with soluble electrodes. The ingots obtained were forged at 1000 - 1200°C into rods of 12 - 14 mm diameter. These were aged and then specimens for mechanical testing were cut from them. It

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Thermal stability and ...

S/598/62/000/007/025/040
D217/D307

was found that the alloys AT3, AT4, AT6 and AT8 from laboratory melts which contain average or below average total alloy contents are thermally stable at 450 and 500°C after ageing for 100 hours. They do not become enbrittled and do not exhibit any noticeable changes in mechanical properties. Only alloys containing above a certain limit of impurity content age and become brittle. Alloys AT3, AT4 and AT6 from the production melts exhibited thermal stability after ageing at 400, 450 and 500°C for 100 hours. There are 4 figures and 4 tables.

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18 1285

S/598/62/000/007/026/040
D217/D307

AUTHORS: Kornilov, I. I., Mikheyev, V. S. and Chernova, T. S.

TITLE: Influence of annealing in air and in vacuum on the plastic properties of sheet materials made from titanium alloys [illegible] (AT3), [illegible] (AT4), [illegible] (OT4-1) and [illegible] (OT4)

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye splavy, 191-196

TEXT: Alloys of the AT series are 6-component complexes containing Ti-Al-Cr-Fe-Si-B and differing from each other in their Al content. The above alloys, in the form of sheet of 1 mm thickness, were annealed in air and in vacuo between 600 - 1000°C, at 50° intervals, and the change in plastic properties was determined by the change in angle of bend of the sheets after annealing. Soaking time at each temperature was 30 minutes. The optimum conditions of heat treatment for annealing in vacuo and air were de-

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S/598/62/000/007/026/040
D217/D307

Influence of annealing ...

termined for the alloys. It was shown that oxygen and hydrogen greatly influence the plastic properties. They cause brittleness in air-annealed alloys, whereas a decrease in oxygen and hydrogen on annealing in vacuo leads to an increase in plasticity of the alloys. It is concluded that vacuum annealing is essential for the production of sheet, rod, wire, etc. in titanium alloys in order to ensure optimum plasticity. There are 5 figures and 2 tables.

Card 2/2

S/126/62/014/002/007/018
E114/E435

AUTHORS: Mikheyev, V.S., Aleksashin, V.S.

TITLE: Determination of the specific electric resistance (resistivity) of titanium-chromium alloys at temperatures up to 1100°C

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.2, 1962, 231-237

TEXT: The alloys studied contained 1.5, 3, 5, 7.5, 10, 15.5, 17.5 and 20% of chromium. They were melted in a vacuum arc furnace and the specimens were homogenized by holding for 10 hours at 1100°C, 25 hours at 1000°C, 50 hours at 900°C, 100 hours at 800°C, 200 hours at 700°C, 300 hours at 600°C and 75 hours at 550°C. This was followed by furnace cooling to room temperature. The sensitivity of the resistance measurements was 0.000003 ohms for all temperatures up to 1100°C, the temperature being measured to an accuracy of 3 to 5°C. Curves are given showing the variation of resistance with temperature for the various alloys. With the 1.5% Cr alloy the resistance increased steadily up to 730°C but was affected in the range 730 to 880°C by the

Determination of the specific ...

transformation of the $\alpha + \beta$ solid solution into the β form. Above 880°C the rate of increase was smaller. With the 5% Cr alloy, the resistance increased steadily up to 690°C and there were inflexion points at 690 and 825°C corresponding to the phase changes $\alpha + \gamma \longrightarrow \alpha + \beta$ and $\alpha + \beta \longrightarrow \beta$. A similar result was obtained with the 10% chromium alloy, except that the inflexion points occurred at 690 and 770°C. The 12.5, 15.5 and 17.5% alloys showed steady rises up to 690 - 700°C, where there was a sudden change in direction of the curve due to the eutectoid transformation; this was particularly marked with the 15.5% Cr alloy, where the resistance fell in the range 700 to 750°C. The 20% Cr alloy also showed a sharp change but at a temperature of 730°C. The eutectoid transformation was completed at 725°C with 12.5% Cr, 750°C with 15.5%, 825°C with 17.5% and 1000°C with 20%. From the results obtained a partial phase diagram was constructed. The lowest resistivity was found with the 15.5% Cr alloy, which corresponded to the eutectic. The investigation showed that the electrical resistance method could be used to study the phase diagrams of titanium alloys. There are 5 figures and 1 table.

Card 2/3

ASSOCIATION: Institut metallurgii AN SSSR im. A.A.Baykova
(Metallurgical Institute AS USSR imeni A.A.Baykov)

SUBMITTED: May 24, 1961 (initially)
October 30, 1961 (after revision)

Card 3/3

MIKHEYEV, V.S.; POPLAUKHIN, A.S.

Effect of cold deformation and annealing on the mechanical properties of commercial-grade titanium. TSvet. met. 35 no.4:64-69 Ap '62. (MIRA 15:4)

(Titanium--Testing)

40186
S/020/62/145/005/019/020
B101/B144

AUTHORS: Belousov, O. K., Kornilov, I. I., and Mikheyev, V. S.

TITLE: Examination of α-titanium solid solutions highly ductile at -196°C

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 5, 1962, 1102-1105

TEXT: Alloys based on solid α-solutions of the ternary systems Ti-Zr-Mo, Ti-Zr-V, and Ti-Zr-Nb were melted in an electric vacuum furnace to increase the durability of titanium without making it less ductile. The resulting solid α-solutions showed a satisfactory ultimate strength σ_B and impact strength a_k at room temperature and also at -196°C. Alloys with heterogeneous α + β structure, however, showed low ductility at -196°C. The alloys with optimum properties were designated AT-2 (AT-2); data for three of these are compared below with the data for other constructional metals, the best being the AT-2-4 which contains Nb:

Alloy	Data at 20°C				Data at -196°C			
	σ_B kg/mm^2	δ,%	ψ,%	a_k kgm/cm^2	σ_B kg/mm^2	δ,%	ψ,%	a_k kgm/cm^2
Pure TG-00(TG-00) Ti	35	50	80	25-30	60	32	65	23
AT-2-1	80.0	20.9	65.5	17.8	119.5	13.8	37.6	11.2
AT-2-2	75.6	23.9	69.4	19.2	116.0	12.5	44.6	15.8
AT-2-4	65.5	25.0	71.2	24.1	98.6	19.4	69.8	20.3
Duraluminum	40.0	-	-	4.2	50.0	-	-	3.24
Armco iron	32.0	-	-	24.07	78.5	-	-	0.13
Kh-3-N(Kh-3-N) steel	99.7	-	-	11.77	-	-	-	4.05
U-4 (U-4) steel	95.0	-	-	12.15	-	-	-	0.68

The alloys produced on industrial scale confirmed the results of laboratory experiments. Solid α-solutions of the systems Ti-Zr-Ta, Ti-Mo-Ta, and Ti-V-Ta are likewise assumed to have a high impact strength at -196°C. There are 3 figures and 1 table.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy imeni A. A. Baykov)

S/020/62/145/005/019/020
B101/B144

Examination of α-titanium...

PRESENTED: April 9, 1962, by A. A. Blagonravov, Academician

SUBMITTED: March 8, 1962

Card 3/3

KORNILOV, I.I.; MIKHEYEV, V.S.; CHERNOVA, T.S.

Heat treatment of titanium alloys in the five-component system Ti - Al - Cr - Fe - Si. Metalloved. i term. obr. met. no.2: 52-54 F '63. (MIRA 16:3)
(Titanium-aluminum-chromium alloys--Metallography)
(Annealing of metals)

L 11390-63 EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD
ACCESSION NR: AP3000914 S/0279/63/000/002/0130/0135

AUTHOR: Belousov, O. K. (Moscow); Kornilov, I. I. (Moscow); Mikheyev, V. S. (Moscow) 54

TITLE: Mechanical properties of solid solutions of alpha-titanium at -196°C

SOURCE: AN SSSR. Izv. otd. tekh. nauk. Metallurgiya i gornoye delo, no. 2, 1963, 130-135

TOPIC TAGS: ternary Ti-base alloy, Ti-Zr-Mo alloy, Ti-Zr-V alloy, Ti-Zr-Nb alloy, cryogenic effect, AT-2 alloy, cryogenic alloy

ABSTRACT: Three series of ternary Ti-base alloys, Ti-Zr-Mo, Ti-Zr-V, and Ti-Zr-Nb, have been studied in a search for a material for service at cryogenic temperatures. All alloys (six in each series) had the same Zr content, approximately 2.5%. The Mo, V, and Nb contents varied from 0.34 to 4.88, 0.19 to 4.81, and 0.32 to 3.16%, respectively. The solubility of V, Nb, and Mo in Ti-2.5% Zr alloy at 800C was found to be 0.5, 1.0, and 0.3—0.4% for alloys made with iodide titanium, and 0.9 to 1.0, 1.5, and 0.5% for alloys made with TG-00 titanium sponge. With decreasing temperature the solubility of V, Nb, and Mo increases. The alloys designed to have an α or α + β structure were melted in a vacuum-arc consumable-electrode furnace from TG-00 titanium sponge (99.85% pure

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iodide Zr, 99.90% pure Mo, Nb (98.8% Nb, 0.5% Ta), and 99.85% pure V), forged at 950—1000C, annealed at 750C for 40 min, and furnace cooled. Mechanical tests showed that with increasing Mo, V, or Nb content the tensile and yield strengths increase and ductility decreases at both +20 and -196C. The notch toughness-composition curves show a maximum at 0.70% Mo, 0.50% V, and 1.00% Nb for -196C and at 1.40% Mo, 2.30% V, and 1.60% Nb for 20C. Ti-Zr-Nb alloys with 0.32 to 1.84% Nb have the highest notch toughness —2.16—24.1 mkg/cm^2 and 20.0—19.6 mkg/cm^2 at +20 and -196C, respectively. A sharp drop in impact toughness occurs in all systems with the appearance of the β-phase in the alloy structure. On the basis of these experiments a new series of alloys, designated AT-2, has been developed. These alloys have an average tensile strength of 60—80 kg/mm^2 at +20C, which is slightly lower than that of other Ti-alloys, but their notch toughness at both +20 and -196C is much higher. Similar high-ductility alloys may exist in other systems of Ti with its analogs Zr and Hf and metals close to Ti in the periodic system. The assumption has been verified experimentally with regard to Ti-V-Nb, Ti-V-Mo, and Ti-Nb-Mo systems and is expected to be true with regard to Ti-Zr-Ta, Ti-Mo-Ta, Ti-V-Ta, and other analogous ternary and more complex systems. Orig. art. has: 2 tables and 3 figures.

ASSOCIATION: none

Card 2/2

ACCESSION NR: AT4007024 S/2598/63/000/010/0027/0036

AUTHOR: Belousov, O. K.; Kornilov, I. I.; Mikheyev, V. S.

TITLE: Phase diagram of the titanium-vanadium-niobium-molybdenum system

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovy*kh splavov, 27-36

TOPIC TAGS: titanium molybdenum niobium alloy, titanium quaternary alloy, titanium alloy, phase diagram, titanium alloy structure, component solubility, alloy component solubility, vanadium containing alloy

ABSTRACT: In a study of the Ti-V-Nb-Mo system, isothermic cross sections were constructed from microstructure analysis and measurements of hardness and electrical resistivity at 600, 700 and 800C. Solubilities of the 3 admixtures in α-Ti are given in Table 1 of the Enclosure. Of special interest is a sharp phase boundary change occurring during the α-Ti + β - Ti $\rightarrow$ β-Ti transformation, which was observed by measurement of electrical resistivity while slowly heating (1-2C/min.) the specimen from 0 to 1000C. Upon quenching the alloy system from the β-phase, marked changes appeared that correspond to occurrence of metastable phases. The phase diagram of the Ti-V-Cb-Mb

Card 1/4

ACCESSION NR: AT4007024

alloy system is shown in Figure 1 of the Enclosure. Orig. art. has: 6 metallographic sections, 2 tables, 3 graphs, and 8 phase diagrams.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute AN SSSR)

SUBMITTED: 00	DATE ACQ: 27Dec63	ENCL: 02
SUB CODE: MM	NO REF SOV: 008	OTHER: 005

Card 2/4

ENCLOSURE: 01

ACCESSION NR: AT4007024

TABLE 1

Solubility in α - Ti

Temperature °C	V	Cb	Mo
600	2.2-2.3%	3.6-3.8%	1.2%
700	1.5%	3.0%	0.8-0.9%
800	0.9-1.0%	1.5%	0.5%

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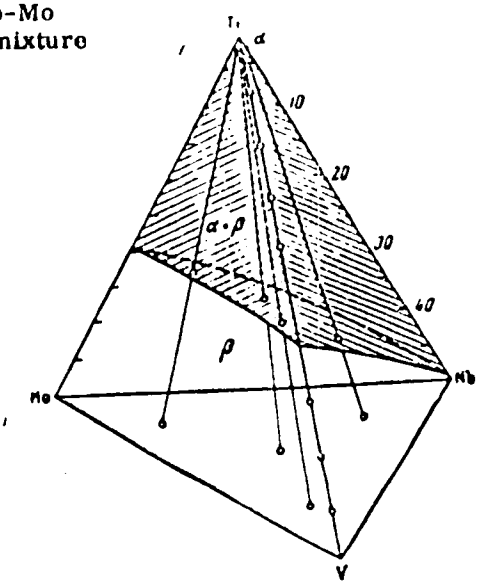
ACCESSION NR: AT4007024

ENCLOSURE: 02

Fig. 1 - Phase diagram of the Ti-V-Nb-Mo system at 600C and a total admixture concentration up to 50%.



Card 4/4

ACCESSION NR: AT4007026 S/2598/63/000/010/0042/0047

AUTHOR: Mikheyev, V.S.; Markovich, K.P.; Tavadze, L.F.

TITLE: Study of some alloys of the system Ti-Al-Cr-Fe-Si-B containing 3% Al

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovy*kh splavov, 42-47

TOPIC TAGS: titanium alloy, titanium aluminum chromium alloy, titanium aluminum chromium system, titanium complex alloy, alloy structure, phase transformation, alloy phase composition, iron containing alloy, silicon containing alloy, boron containing alloy

ABSTRACT: The authors investigated the effect of increasing concentrations (0.45-2.5%) of the alloying elements Cr, Fe and Si (1:1:1) on the ternary - solid solution of the Ti-Al-B system with 94.49-96.5% Ti and constant amounts of Al (3%) and B (0.01%). The alloys were smelted in a vacuum arc furnace with a tungsten electrode in an inert gas, cast, and the cast alloys were worked at 1000C, annealed and then quenched in air. The bars were then examined by optical methods to determine the melting diagram, by thermal analysis to determine the phase transformations in the solid state, and by metallographic analysis

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ACCESSION NR: AT4007026

to determine the microstructure (samples quenched from 1000, 800 or 600C in ice water after annealing for 2-400 hrs.). Using the N.S. Kurnakov pyrometer and samples heated for 2 hrs. at 1000, 300 hrs. at 800 and 400 hrs. at 600C, the authors constructed the polythermic cross section of the system between 400 and 1700C (see Fig. 1 in the Enclosure). This showed the presence of β, $\alpha + \beta$, α, α + excess metal, and $\alpha + \beta + \gamma$ phases. The temperature of the onset of $\alpha \rightarrow \beta$ transformation was found to be independent of the sum of Cr, Fe and Si in the alloy. The softening temperature of the alloys decreased from 1535 to 1470C as the sum of Cr, Fe and Si increased from 0.45 to 2.5%. Finally, the solubility of these three alloying elements in the α-solid solution of Ti was found to be 1% at 600 and 1.5% at 800C. Orig. art. has: 3 tables, 2 graphs and 8 photomicrographs.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR)

SUBMITTED: 00	DATE ACQ: 27Dec63	ENCL: 01
SUB CODE : MM	NO REF SOV: 006	OTHER: 000

Card 2/3

CCESSION NR: AT4007026

Enclosure 01

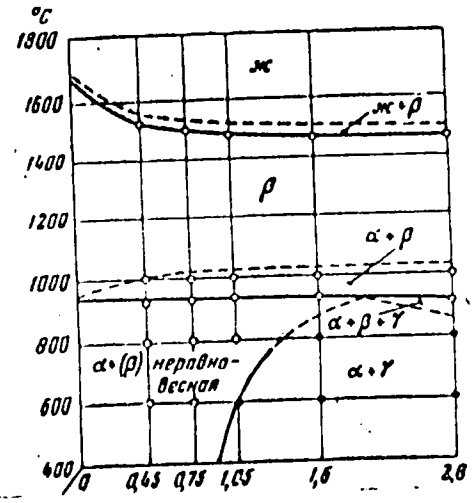

Fig. 1. Polythermic cross section of alloys of the system Ti-Al-Cr-Fe-Si-B with 3% Al and a varying total content of Cr - Fe - Si. Abscissa = wt.% Cr-Fe-Si.

α + (β) not in equilibrium

Card 3/3

MIKHEYEV, V.S.; CHERNOVA, T.S.; DZHIBUTI, N.M.

Investigating a partial constitutional diagram of the system Ti - Al - Cr - Fe - Si - B on a section with 6% Al. Titan i ego splavy no.10:48-54 '63. (MIRA 17:1)

ACCESSION NR: AT4007043 S/2598/63/000/010/0214/0217

AUTHOR: Mikheyev, V. S.; Markovich, K. P.; Fridman, Z. G.

TITLE: Heat resistance, creep and structural stability of AT-3 titanium alloy

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovy*kh splavov, 214-217

TOPIC TAGS: titanium alloy, AT-3 titanium alloy, titanium alloy heat resistance, titanium alloy creep, titanium alloy structural stability, titanium alloy embrittlement, titanium alloy property, alloy heat resistance, alloy creep strength

ABSTRACT: The authors investigated the heat resistance, creep and thermal stability of an AT-3 Ti alloy (2.7% Al, 0.60% Cr, 0.30% Fe, 0.35% Si and 0.01%B) smelted under industrial conditions, annealed for 30 min. at 800C and cooled in the furnace. Heat resistance was tested by determining the tensile strength at 350C for loading times of 108, 1600 and 3500 hrs., resulting in σ^{C} values of 59, 58 and 55 kg/mm^2, respectively. The results of creep tests at 350C under loads of 15-45 kg/mm^2 (see Fig. 1 in the Enclosure) indicate that the relative deformation of this alloy is relatively constant at loads between 15 and 40 kg/mm^2, with no sign of brittleness. As shown by Fig. 2 in the Enclosure, brittleness also did not develop when the alloy was aged in argon at 400C for 3000 hrs. or at 350C

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ACCESSION NR: AT4007043

for up to 5000 hrs. without a load. Subjection of the alloy to a load of 30 kg/mm^2 for 5000 hrs. at 300C or up to 6600 hrs. at 350C, as well as cyclic heating (350C) and cooling (in air or water) for as many as 700 cycles, also had no detrimental effect on the mechanical properties. Orig. art. has: 4 tables and 2 figures.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR)

SUBMITTED: 00	DATE ACQ: 27Dec63	ENCL: 02
SUB CODE: MM	NO REF SOV: 002	OTHER: 000

Card 2/4

ACCESSION NR: AT4007043

Enclosure 01

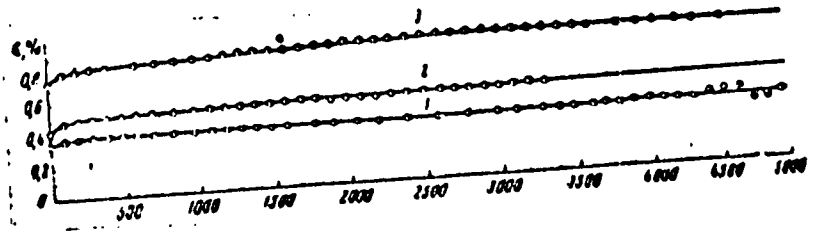

Fig. 1. Creep curves of alloy AT-3 at 350C and loads of: 1) 30, 2) 37 and 3 and 3) 45 kg/mm^2. Abscissa = time in hrs.

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ACCESSION NR: AT4007043

Enclosure 02

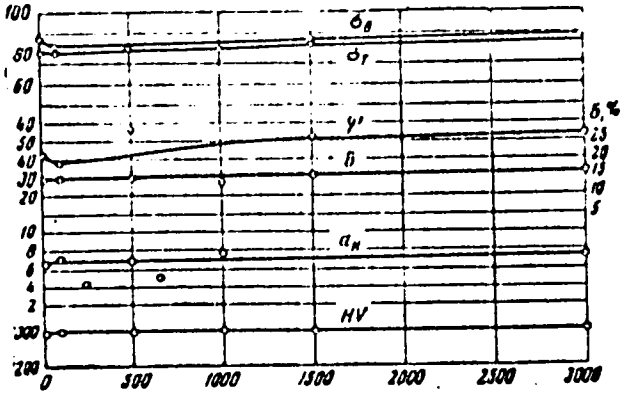

Fig. 2. Dependence of the mechanical properties of alloy AT-3 on the duration of aging at 350C. Units on the ordinate are kg/mm^2; abscissa = aging time in hrs.

Card 4/4

LIVANOV, V.A.; KELESH'YAN, N.M.; FAYNBRON, S.M.; RYABOVA, R.M.; Prinimali uchastiye: MIKHEYEV, V.S.; IVANOVA, S.Ye.

Investigating the composition and properties of industrially prepared AT-3 titanium alloys. Titan i ego splavy no.10:218-223 '63. (MIRA 17:1)

ACCESSION NR: AT4007046 S/2598/63/000/010/0234/0244

AUTHOR: Kornilov, I.I.; Mikheyev, V.S.; Andreyev, O.N.; Mayboroda, P.S.

TITLE: Heat resistance of some titanium alloys at 450-700 C

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovy*kh splavov, 234-244

TOPIC TAGS: titanium alloy heat resistance, titanium alloy, OT-4 alloy, OT-4-2 alloy, AT-3 alloy, AT-4 alloy, AT-6 alloy, AT-8 alloy, AT-9-0 alloy, AT-10 alloy, AT-10-0 alloy, AT-12 alloy, Ti sub 3 Al base alloy, titanium aluminum alloy, titanium aluminum manganese alloy, titanium aluminum vanadium alloy, VT-5-1 alloy, VT-14 alloy

ABSTRACT: The heat resistance of the VT-1, VT-5-1, VT-14, OT-4-2, AT-3, AT-4, AT-6, and AT-8 alloys was tested by a simple centrifugal method to determine the creep limit under thermal loads. Tests were carried out under loads of 20 kg/mm^2 at temperatures up to 700 C; specifically, tests were conducted at 450 C for 5000 hours, at 500 C for 250 hours, at 550 C for 100 hours, at 600 C for 50 hours, and at 700 C for 500 hours. Isotherms for the tested conditions were plotted. It was concluded that the VT-1 and VT-14 alloys are not heat resistant at any of the temperatures. The highest heat resistance at 600-700 C was shown by the AT-10 and AT-12 alloys, which contain

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ACCESSION NR: AT4007046

7 or 8 alloying elements, and the ST-2 alloy, which contains Ti_3Al as a main component. The AT-3 and AT-4 alloys showed good heat resistance up to 500 C and the AT-6 alloy up to 550 C. The AT-8 alloy, containing Al, Cr, Fe, Si, and B on a base of α-titanium showed a greater heat resistance at higher temperatures (up to 600 C) than the OT-4 and OT-4-2 alloys containing Ti, Al, and Mn or Ti, Al, and V with an $\alpha+\beta$ structure and VT-6 or VT-5-1 alloys containing Ti, Al, and Sn. It was proved that the heat resistance is increased by alloying with many elements. The heat resistance of the alloys containing six alloying elements increased in the direction AT-3 → AT-4 → AT-6 → AT-8 as their aluminum content increased. This was explained by the increase in the temperature of the $\alpha \rightleftarrows \beta$ transformation and the strengthening of the α solid solution. Orig. art. has: 10 figures and 2 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR)

SUBMITTED: 00 DATE ACQ: 27Dec63 ENCL: 00

SUB CODE: ML NO REF SOV: 016 OTHER: 000

Card 2/2

ACCESSION NR: AT4007058 S/2598/63/000/010/0345/0356

AUTHOR: Livanov, V.A.; Mikheyev, V.S.; Faynbron, S.M.; Kutsenko, A.A.; Ivanova, S.Ye.

TITLE: Tensile and rupture strength of the six-component titanium alloys AT-3, AT-4, AT-6 and AT-8

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovy*kh splavov, 345-356

TOPIC TAGS: titanium alloy, AT-3 titanium alloy, AT-4 titanium alloy, AT-6 titanium alloy, AT-8 titanium alloy, titanium alloy mechanical property, alloy rupture strength, complex titanium alloy, titanium alloy property, titanium alloy heat resistance, titanium aluminum chromium alloy, iron containing alloy, silicon containing alloy, boron containing alloy

ABSTRACT: This study concerns the mechanical properties and high temperature strength of titanium alloys AT-3, AT-4, AT-6 and AT-8. Specimens were taken from two different production lots with varying contents of Al, Cr, Fe, Si and B. They were prepared from forged rods (14 x 14 mm), and subjected to preliminary tempering at 850, 900 and 950C. Tensile strength was tested at temperatures ranging from 20 to 700C (see Fig. 1 in the

Card 1/2

ACCESSION NR: AT4007058

Enclosure). In addition, the authors considered the effects of forging procedures on mechanical properties (see Fig. 2 in the Enclosure). Rupture strength was tested at temperatures of 400-600C and loads of 15-55 kg/mm^2 (results are tabulated), taking into consideration the effect of varying aluminum contents (see Fig. 3 in the Enclosure). The authors conclude that AT titanium alloys with 3-7.5% Al and a combined Cr-Fe-Si content of 1.5-1.8% exhibit high tensile strength (80-90 kg/mm^2 for AT-3 at room temperature, 90-105 for AT-4, 105-115 for AT-6 and 115-125 for AT-8). The plastic properties deteriorate as the Al content increases (14-15% elongation and 51-53% cross-section shrinkage for AT-3, 11-13% and 38%, respectively for AT-8). The rupture temperature rises as the Al content increases (450C for AT-3 to 550C for AT-8). The high temperature strength was good. The tempering temperature affects the duration of rupture strength tests. In view of their mechanical properties at room and high temperatures and their high temperature strength, the alloys named are suitable for wide use in modern technology. Orig. art. has: 4 tables and 4 graphs.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of metallurgy, AN SSSR)

SUBMITTED: 00 DATE ACQ: 27Dec63 ENCL: 04

SUB CODE: ML NO REF SOV: 002 OTHER: 000

Card 2/2

L 15510-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JXT(LJP)/JD/JG
ACCESSION NR: AP3004591 S/0126/63/016/001/0057/0060

AUTHOR: Kornilov, I. I.; Mikheyev, V. S.; Konstantinov, K. M. 60 59

TITLE: Investigation of resistivity of alloys of the Ti-Al system from room temperature to 1200C

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 1, 1963, 57-60

TOPIC TAGS: titanium aluminum alloy, titanium aluminum system, titanium aluminum alloy resistivity, resistivity temperature gradient

ABSTRACT: The resistivity of 11 Ti-Al alloys containing 0—17.5% Al was measured in the range from room temperature to 1200C. Alloys were melted from TG-00 titanium sponge and 99.9% pure Al, annealed at 900C for 100 hr, 800C for 200 hr, and 700C for 100 hr, and furnace-cooled. Test specimens approximately 30 x 5 x 2.5 mm were stress-relieved at 700—750C for 30 min in a vacuum of 10^{-4} mm Hg. The test results (see Fig. 1 of the Enclosure) show

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L 15510-63

ACCESSION NR: AP3004591

that Al increases resistivity. At 900—1100C, the temperature of α to β transformation, resistivity decreases sharply. The temperature gradient of resistivity decreases with increasing Al content, and for alloys with 7.5—17.5% Al it is close to zero. Unalloyed titanium shows a considerable change of resistivity, from 0.5 ohm mm^2/m at room temperature to 1.65 ohm mm^2/m at the temperature of $\alpha \rightleftarrows \beta$ transformation. The temperature gradient of the β-phase of unalloyed titanium at 910—1000C is 0.012 μohm cm/deg. The diagram of $\alpha \rightleftarrows \beta$ transformation for Al contents from zero to 17.5% plotted on the basis of resistivity measurements coincides in general with diagrams obtained by other methods. Orig. art. has: 2 figures.

ASSOCIATION: Institut metallurgii im. A. A. Baykova AN SSSR (Institute of Metallurgy, AN SSSR)

SUBMITTED: 09Oct62 DATE ACQ: 27Aug63 ENCL: 01

SUB CODE: MA, ML NO REF SOV: 003 OTHER: 007

Card 2/2

ACCESSION NR: AP4029839 S/0279/64/000/002/0156/0160

AUTHOR: Mikheyev, V. S. (Moscow); Chernova, T. S. (Moscow); Myasnikova, K. P. (Moscow); Markovich, K. P. (Moscow)

TITLE: On the composition and structure of the intermetallic compound phase in alloys of the Ti-Al-Cr-Fe-Si-B 6 component system

SOURCE: AN SSSR. Izv. Metallurgiya i gornoye delo, no. 2, 196[illegible] 156-160

TOPIC TAGS: titanium base alloy, aluminum containing alloy, chromium containing alloy, iron containing alloy, silicon containing alloy, boron containing alloy, alloy composition, phase composition, intermetallic compound phase

ABSTRACT: To determine the nature of intermetallic phase present in six-component aluminum-base alloys, the authors studied two series of alloys containing 0.5-15.0% chromium, 0.5-15.0% iron, 0.5-15.0% silicon, 0.01% boron. One series did not contain aluminum, and the other had a 3 and 6 wt.-% aluminum content. The alloys were melted from TG-00 sponge titanium, A-000 aluminum, KR-0 reduced technical iron, electrolytic chromium, and chromium-boron master alloy containing 10% of the latter. The alloys were melted in an arc vacuum furnace. The alloys were studied by means of microstructural and x-ray structural analyses after an-

Card 1/2

ACCESSION NR: AP4029839

nealing at temperatures of 1200, 1100, 800, and 500°C over periods of 4, 25, 200, and 500 hours, respectively. In evaluating the results the authors concluded that the phase in question is Ti_5Si_3 precipitating along the line of secondary crystallization from the beta-titanium-base solid solution. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 16Sep63 ENCL: 00 SUB CODE: MM

NO REF SOV: 004 OTHER: 004

Card 2/2

MIKHEYEV, V.S.; PROKHOROV, B.B.

Research of the young Siberian geographers. Izv. Vses. geog. ob-va 96 no.6:537-540 N-D '64 (MIRA 18:1)

L 36529-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/GD

ACC NR: AT6012396 SOURCE CODE: UR/0000/65/000/000/0238/0242

AUTHORS: Kornilov, I. I. (Doctor of chemical sciences, Professor); Livanov, V. A.; Belousov, O. K.; Faynbron, S. M.; Mikheyev, V. S.; Ivanova, S. Ye.; Ryabova, R. M.

ORG: none

TITLE: The effect of thermal processing on the mechanical properties of type AT2 alloys

SOURCE: Soveshchaniye po metallokhimii, metallovedeniyu i primeneniyu titana i yego splavov, 6th. Novyye issledovaniya titanovykh splavov (New research on titanium alloys); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 238-242

TOPIC TAGS: titanium, titanium alloy, tempering, thermal treatment / AT2 titanium alloy

ABSTRACT: The results are given for studies of the effect of thermal processing on the mechanical properties of type AT2 alloys. Several compositions were investigated, which displayed high plastic and shock-resistance properties at room and at low (-196 and -253C) temperatures. These alloys were given the designations AT2-1, AT2-2, and AT2-3, and were produced in sheets in industrial conditions. Measurements were made of the dependence of the resistivity of these compositions on the testing temperature (see Fig. 1). Thermal processing was bounded in the temperature range 500--1000C. The thermal process included: 1) heating at the prescribed temperature for 30 minutes; 2) 60-minute air-cooling, and 3) 60-minute oven cooling. The mechanical properties of the

UDC: 669.295.001.5

Card 1/2

Card 2/2 MLP

KRAUKLIS, A.A.; MIKHEYEV, V.S.

Landform study for the purpose of land valuation in the mountain taiga of northern Transbaikalia. Dokl. Inst. geog. Sib. i Dal'. Vost. no.3:29-36 '63.

(MIRA 18:12)

L 10593-65 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(b) Pu-4 IJP(c)/ASD(m)-3
JD/JG/MLK

ACCESSION NR: AT4048070 S/0000/64/000/000/0190/0195

AUTHOR: Kornilov, I.I., (Professor, Doctor of chemical sciences), Belousov, O.K., Mikheyev, V.S. 8+1

TITLE: A study of creep in Ti-V-Nb-Mo alloys

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy* soveshchaniya, Moscow, Izd-vo Nauka, 1964, 190-195

TOPIC TAGS: titanium alloy, titanium alloy creep, titanium alloy heat resistance, vanadium admixture, niobium admixture, molybdenum admixture

ABSTRACT: When vanadium, niobium and molybdenum are introduced into titanium the ultimate strength and elasticity are increased, while the relative elongation and resiliency remain at high levels. The present paper considers the heat resistance of Ti-V-Nb-Mo alloys. As in earlier studies, heat resistance was tested by the centrifugal method. During the first stage, samples were tested at 500C and an initial stress of 15 kg/mm^2 for 100 hours; the second stage was 100 hours at 20 kg/mm^2; during the third stage, the temperature was increased to 600C at the previously mentioned stress for 100 hours.

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L 16593-65

ACCESSION NR: AT4048070

Thus, the total time was 300 hours at stresses of 15-20 kg/mm^2 and temperatures of 500 and 600C. The alloy samples were made with V:Nb:Mo=1:1:1 (section I), Mo:sum of V, Nb=2:1 (section II), Nb:sum of V, Mo=2:1 (section III), and V: sum of Nb, Mo=2:1 (section IV). The creep curves are shown in Fig. 1 of the Enclosure. Analysis of the relationship between deflection and duration of deformation showed that the alloys behaved differently. Titanium had the highest creep rate, while alloys near the boundary of saturated α_4 solid solutions had higher resistance. Alloys with B_4 solid solutions had the highest strength. The creep rate of these alloys at 500C and a stress of 15-20 kg/mm^2 for 200 hours was near to zero, while at 600C the creep of these alloys increased sharply. The data obtained on the relationship between heat resistance, composition and phase structure indicate that all alloys of the α- phase of the Ti-V-Nb-Mo alloy are rapidly weakened at 500C and 15 kg/mm^2 and cannot resist heat for a long time under these conditions. The introduction of molybdenum is the best way to increase the heat resistance. These data corroborate the results of I.I. Kornilov on the variation of heat resistance in systems with limited solubility in the solid state and polymorphic characteristics of one of the components. Orig. art. has: 4 figures.

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ACCESSION NR: AT4048070

ASSOCIATION: none

SUBMITTED: 15Jul64 ENCL: 01 SUB CODE: MM, AS

NO REF SOV: 012 OTHER: 002

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L 16593-65
ACCESSION NR: AT4048070 ENCLOSURE: 01

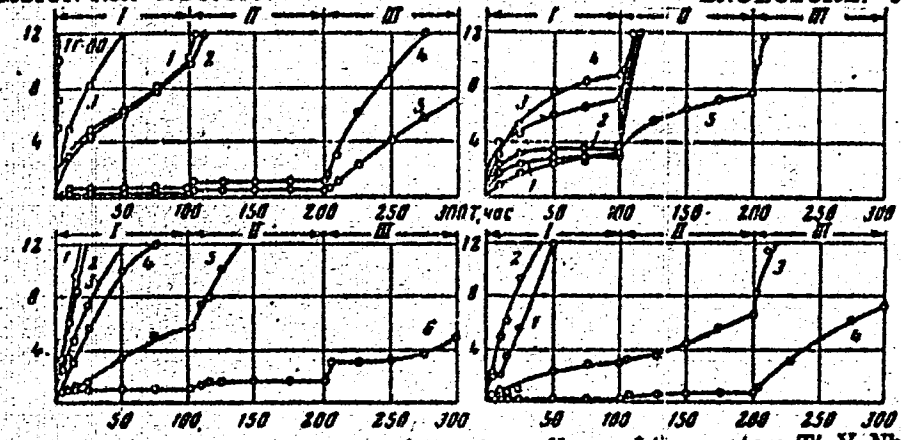

Fig. 1. Creep curves of titanium and titanium alloys of the system Ti-V-Nb-Mo. Testing conditions: I - t =500C, σ = 15 kg/mm^2; II- t = 500C, σ = 20 kg/mm^2; III - t = 600C, σ = 20 kg/mm^2. a. section I, $\sum$(V, Nb, Mo): 1-2.4%, 2-4.2%, etc. b. section II, $\sum$(V, Nb, Mo): 1-2.4%, 2-4.2%, etc. c. section III, $\sum$(V, Nb, Mo): 1-2.4%, 2-4.2%, etc. section IV, $\sum$ (V, Nb, Mo): 1-2.4%, 2-4.2%, etc.

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L 15671-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(b) ASD-3/AFFTC/ESD-3/IJP(c)/ ASD(m)-3 MJW/JD/MLK

ACCESSION NR: AT4048072 S/0000/64/000/000/0204/0207

AUTHOR: Markovich, K.P., Mikheyev, V.S., Fridman, Z.G.

TITLE: Creep of the AT3 alloy at 350C

B+1

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 204-207

TOPIC TAGS: titanium alloy, titanium alloy creep, aluminum containing alloy, titanium alloy heat resistance, titanium alloy mechanical property, alloy AT3

ABSTRACT: At present the only high strength alloys with a specific gravity of 4.4-4.6 g/cc suitable for work between 300 and 550C are alloys on a titanium base. It is therefore necessary to investigate the heat resistance of these alloys, especially during creep. The paper describes studies on the creep limit of the AT3 titanium alloy at 350C for a total deformation of 1% after 20,000 hours, as well as the changes in mechanical properties after creep testing. Previous tests showed high creep resistance at temperatures of 300 and 350C and stresses of 30 kg/mm^2 after 5,000 hours. The chemical composition of the AT3 alloy is: Ti base, 2.7% Al, 0.6% Cr, 0.30% Fe, 0.38% Fe, 0.36% Si, 0.01% B. The

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test samples were made of forged bars, 20 mm in diam. The testing was done on the IP-5 machine at a constant temperature of 350C and stresses of 15, 30, 33, 37, 45 and 50 kg/mm^2 for 5454, 6662, 5705, 5215, 12000 and 9300 hours. The shape of the curve after creep testing at stresses of 15 and 30 kg/mm^2 approached a straight line. The total deformation after 5000 hours increased with the creep stress from 0.18% at 15 kg/mm^2 to 0.92% at 37 kg/mm^2. For 45 and 50 kg/mm^2 the set creep begins after 400 hours and does not end before 12,000 hours, when the total deformation is 1.2%. The tests showed that the creep rate at a residual deformation of 1% after 20,000 hours is 5×10^{-5} %/hr. Consequently, the limiting stress causing a creep rate of 5×10^{-6} %/hr at 350C for AT3, containing 2.7% Al and 1.26% Cr, Fe and Si, is 42 kg/mm^2. After the creep test, the ultimate strength and plasticity were not significantly changed. The alloy did not become brittle. The authors note that the creep rate of alloy AT3 does not exceed 2×10^{-5} %/hr for a creep stress of 37 kg/mm^2, although at 45 and 50 kg/mm^2 it equals 0.5×10^{-4} and 1.6×10^{-4} %/hr. Orig. art. has: 4 figures.

ASSOCIATION: none

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L 15671-65
ACCESSION NR: AT4048072

SUBMITTED: 15 Jul64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 000

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L 16594-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) IJP(c)/ASD(m)-3 MJW/JD/MLK

ACCESSION NR: AT4048076 S/0000/64/000/000/0222/0226

AUTHOR: Mikheyev, V.S. 14 B+1

TITLE: Investigation of the mechanical properties of AT3, AT4, AT6 and AT8 titanium alloys depending on the testing temperature 18 18 10 10 27

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 222-226

TOPIC TAGS: titanium alloy, titanium alloy mechanical property, titanium alloy strength, titanium alloy plasticity, aluminum containing alloy/alloy AT3, alloy AT4, alloy AT6, alloy

ABSTRACT: The author investigated the mechanical properties of AT alloys at testing temperatures of 20 to 800-1000C. The 14 x 14 mm forged bars were annealed at 730C for 30 minutes with air cooling. Standard samples 5 mm in diameter and 25 mm in length were then turned on a lathe. The alloys with optimal properties were unbalanced α-solid solutions with an insignificant quantity of β phase. Fig. 1 of the Enclosure illustrates the results of mechanical testing. The ultimate strength of titanium is sharply lowered when the testing temperature is raised to 200C, as well as between 500 and 800C, while the changes between 200 and 500C are insignificant. The TG1 titanium (0.06-0.10%

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Fe, 0.02-0.03% Ni, 0.03-0.05% Mg, 0.53-0.05% Si, 0.04-0.06% C, 0.02-0.06% N, 0.005-0.008% H_2, 0.15-0.25% O_2) has 5-7 times more admixtures than iodide titanium and has twice the ultimate strength (50-60 kg/mm^2). The introduction of Al, Cr, Fe, Si and B into titanium alloys increased the ultimate strength in comparison with iodide titanium and lowers the plasticity. At room temperature, the ultimate strength of alloy AT3 is 85-87 kg/mm^2, while at 200C it is 60-65 kg/mm^2, at 300-500C it becomes 57.1-63.2 to 53-55.6 kg/mm^2, and at 700-800C the ultimate strength of the alloy drops to 14-8 kg/mm^2. The curves of AT4, AT6 and AT8 behave in the same way. The tests showed that increasing the aluminum content in the α-solid solution leads to lower plasticity. As the content of Cr, Fe and Si increases, the ultimate strength of the alloys also increases. The paper concludes that Ti-Al-Cr-Fe-Si-B alloys, types AT3, AT4, AT6 and AT8, have an α-solid solution structure with an insignificant quantity of β phase, with high mechanical properties at both room and high (450-600C) temperatures. Increasing the aluminum content to 3-8% with a constant total content of Cr, Fe, Si and B leads to an increase in ultimate strength, while the plasticity is lowered. As the testing temperature increases, the ultimate strength of titanium and AT3, AT4, AT6 and AT8 alloys drops. The elongation changes only slightly at temperatures up to 450C,

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but then changes sharply with a further increase in temperature. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: none

SUBMITTED: 15Jul64 ENCL: 01 SUB CODE: MM

NO REF SOV: 003 OTHER: 000

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L 16594-65
ACCESSION NR: AT4048076

ENCLOSURE: 01

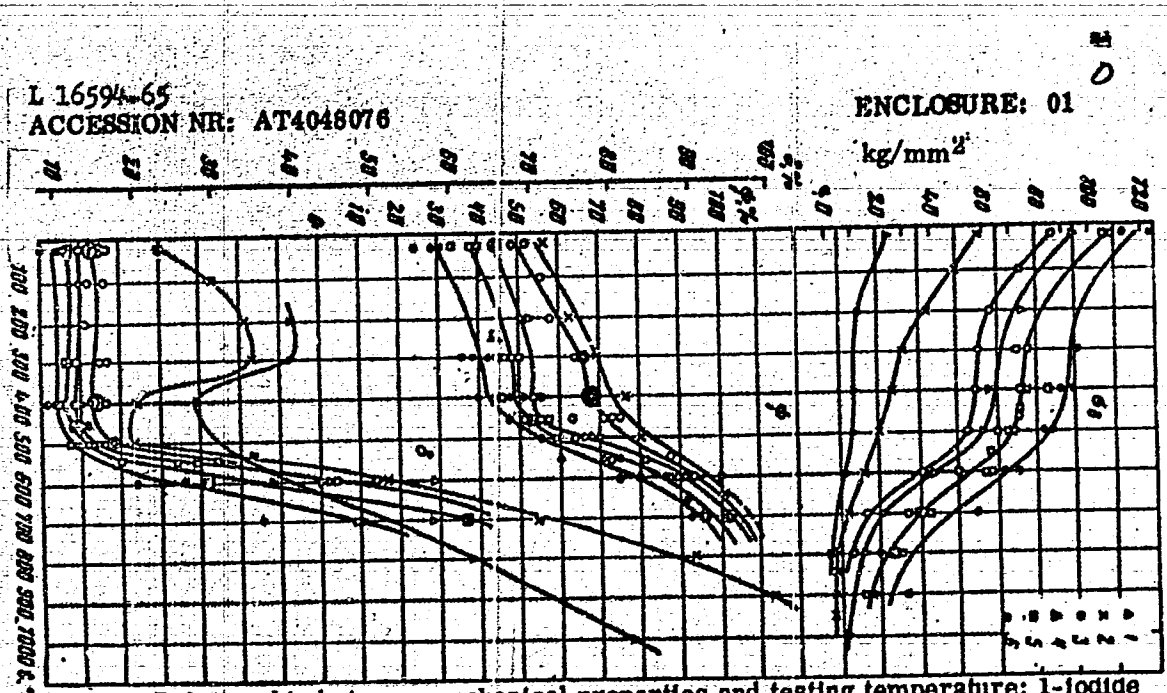

Fig. 1. Relationship between mechanical properties and testing temperature: 1-iodide titanium, 2-magnesiothermic titanium; 3-AT3 alloy; 4-AT4 alloy; 5-AT6 alloy; 6-AT8 alloy.

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L 15666-65 EWT(m)/EWP(w)/EWA(d)/EPR/EWP(t)/EWP(b) Ps-4 ASD-3/AFFTC/ESD-3/IJP(c)/ASD(m)-3 MJW/JD/JG/MLK
ACCESSION NR: AT4048080 S/0000/64/000/000/0243/0248

AUTHOR: Markovich, K.P., Mikheyev, V.S.

TITLE: Thermal stability of the AT3 alloy at 350 and 400C

B+1

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 243-248

TOPIC TAGS: titanium alloy, aluminum containing alloy, titanium alloy thermal stability, titanium alloy aging, titanium alloy plasticity, titanium alloy strength/alloy AT3

ABSTRACT: Since the AT3 alloy is now being used in machinery working for prolonged periods at 350-400C, it has become necessary to test the stability of this alloy under these conditions. The chemical composition of the tested melts were as follows, in % by weight: AT3-1 (Ti-base, Al-3.7, Cr-0.60, Fe-0.30, Si-0.36, B-0.01, sum of Cr, Fe, Si- 1.26) and AT3-2 (Ti-base, Al-3.8, Cr-0.79, Fe-0.44, Si-0.30, B-0.01, sum of Cr, Fe, Si-1.53). The solubility of Cr, Fe, Si in these solid solutions was about 75% at 500C. On the basis of previous tests it may be assumed that the alloy will become brittle after 20,000 hours of work. To test this, the alloy was aged at 350 and 400C for

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10,000 hours without stress in the open air. Previous tests also indicated high stability of AT3, AT4, AT6 and AT8 alloys at 400, 450 and 500C during 100 hours. When AT3, AT6, AT8 alloys were tested for stability at 400 and 450C for 300-7,000 hours the plasticity dropped at first but was restored to the initial value after 3,000 hours. The authors used 14 x 14 mm samples from two melts consisting of TGO titanium with an ultimate strength of 39-43 kg/mm^2, KR silicon, Khl chromium, technical iron, A100 aluminum and chromium-boron alloying element (up to 10% B). The alloys were aged by loading them into a heated furnace without preliminary annealing. The mechanical properties were measured after 100, 500, 1000, 2000, 3000, 5000 and 10,000 hours. The test results after aging at 350 and 400C for 10,000 hours showed no changes in strength. Plasticity also remained the same. Elongation of the alloys changed from 14.3-14 to 15% for AT3-1 alloy and to 13.8% for the AT3-2 alloy. The resiliency dropped during aging. However, it remained constant at 7.5-5.5 kg·m/cm^2 for 2000-5000 hours, dropping to 3.5-3.75 kg·m/cm^2 after 10,000 hours. Investigation of the microstructure after aging showed no changes. However, prolonged aging at 400C led to hardening of the α phase grains and lowering of the plastic properties of the alloy. The paper concludes that aging of the AT3 alloy containing 2.7-2.8% Al and 1.26 or 1.53% Cr, Fe, Si at 350 and

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ACCESSION NR: AT4048080

0

400C for 10,000 hours does not change the phase content. The AT3 alloy does not become brittle after 10,000 hours of aging, and the ultimate strength and elongation remain unchanged. The drop in plasticity is caused by the growth of the α phase grains and by hydrogenation of the alloy during aging. Orig. art. has: 6 figures

ASSOCIATION: none

SUBMITTED: 15Jul64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 000

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L 14308-65 EPR/EWT(m)/EWP(b)/EWP(t) ASD(m)-3/AFTC(p) JD/JG/MLK
ACCESSION NR: AT4048048 S/0000/64/000/000/0030/0037

AUTHOR: Mikheyev, V. S.; Myasnikova, K. P.

TITLE: The phase structure of alloys of the Ti-Al-Fe-Cr-Si system with a constant aluminum and silicon content

SOURCE: Soveshchaniye po metallurgii, metallovedeniyu i primeneniyu titana i yego splavov. 5th, Moscow, 1963. Metallovedeniye titana (Metallography of titanium); trudy* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 30-37

TOPIC TAGS: alloy structure, alloy hardness, alloy phase composition, titanium alloy, aluminum alloy, iron alloy, chromium alloy, silicon alloy

ABSTRACT: The series of strong alloys formed by chromium, iron, silicon, and boron on a titanium-aluminum base has been well-studied. The present work continues the experiments of Korniilov on the tetrahedral Ti (0.3% Si)-Al-Fe-Cr system, but with the amount of aluminum held constant at 7.5% by weight and varying the amounts of iron and chromium from 3:1 to 1:1 and 1:3, while keeping their total weight between 0.2 and 30%. Materials used for the experiment were sponge titanium, electrolytic chromium, silicon, aluminum, and iron with carbon, manganese, phosphorus, and sulfur impurities. Samples weighing 20 g were prepared in an arc

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ACCESSION NR: AT4048048 O

furnace in an argon atmosphere with a loss of below 0.5%. The samples were cast in rods 7 mm in diameter. All thermal operations were carried out in sealed, evacuated quartz ampoules. The samples were heated to temperatures of 1100, 1000, 800, and 500C and held there for 10, 15, 300, and 750 hours, respectively. The samples were then subjected to microscopic and X-ray analyses. Their hardness was measured by Vickers' method, and their electrical resistance was determined by means of a potentiometer. The results of all these measurements were carefully plotted on graphs showing the phase equilibria boundaries as a function of temperature for each composition, and the electrical resistance and hardness as functions of temperature and composition. (See Figs. 1 and 2 of the Enclosure). Orig. art. has: 1 table, 10 graphs, and 10 photomicrographs.

ASSOCIATION: none

SUBMITTED: 15Jul64 ENCL: 02 SUB CODE: MM

NO REF SOV: 013 OTHER: 002

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L 14308-65
ACCESSION NR: AT4048048

ENCLOSURE: 01

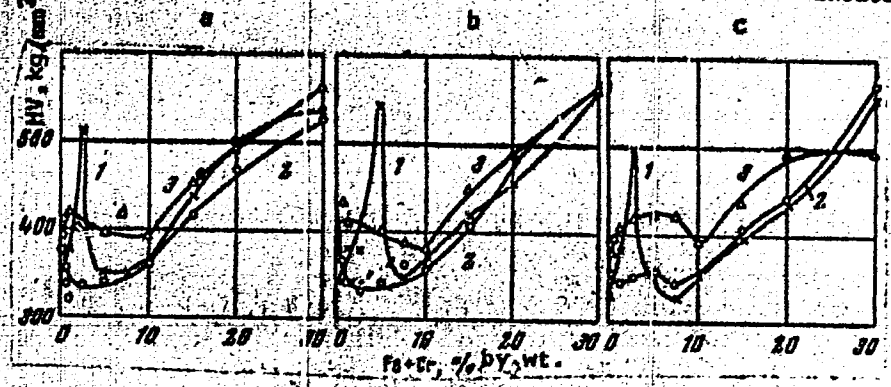

Fig. 1. Dependence of alloy hardness on alloy composition and temperature: a) section I, Fe:Cr = 3:1; b) section II, Fe:Cr = 1:1; c) section III, Fe:Cr = 1:3. 1 - alloys quenched from 1000C; 2 - alloys quenched from 800C; 3 - alloys annealed at 500C.

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L 14308-65
ACCESSION NR: AT4048048

ENCLOSURE: 02

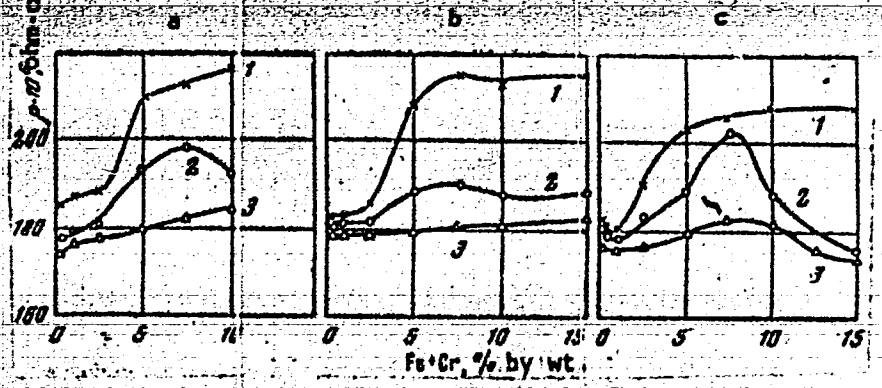

Fig. 2. Dependence of alloy electrical resistivity on alloy composition and temperature:

a), b), c) as in Fig. 1 above; 1, 2, 3 as in Fig. 1 above.

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MIKHEYEV, V.S.

Landform studies in the mountain taiga regions of northern Transbaikalia. Vest. Mosk. un. Ser. 5: Geog. 20 no.5:72-74 S-O '65. (MIRA 18:12)

SIROTIN, Anatoliy Maksimovich; MIKHEYEV, Vasiliy Stepanovich; BENYUKOV, O.M., red.; TROFIMOV, A.V., tekhn. red.

[Through our sister nation of Czechoslovakia; notes on its agriculture] Po zemle bratskoi Chekhoslovakii; zametki o sel'skom khoziaistve. Moskva, Izd-vo "Znanie," 1958. 39 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.5, no.14). (MIRA 11:9)

(Czechoslovakia--Agriculture)

MIKHEYEV, V.V.
On rheumatic inflammations of the brain
Klinicheskaya Meditsina, Moscow, 1949, 3 (11)

Report on two rheumatic cardiac patients who developed hemiplegia and aphasia. Encephalitis rheumatica and rheumatic vasculitis with cerebral thrombosis are more common findings at autopsy that embolism originating from small thrombotic masses on the semilunar valves. Lymphoid infiltration of the pia mater, vascular stasis, endarteritis, hemorrhage, hyperemia, and perivasculitis are often found. The small vessels show a swollen media, proliferation of the intima and microthrombi. Around the capillaries masses of histiocytes are present and in cases of rheumosepsis even nodular glia formations. Vessels like the basilar and sylvian arteries show marked endarteritis. Intwo other rheumatic patients one showed hemianesthesia with impairment of speech and swallowing and the other parkinsonism with pyramidal symptoms. In this last case a thrombosis of the left sylvian artery was the cause of death. In the subcortical nuclei and the capsula interna numerous small cysts were found.

Van der Molen - Terwolde

SO: Excerpta Medica, Neurology and Psychiatry, Section VIII, Vol II no 10

MIKHEYEV, V. V. (Prof.)

"Acute demyelinating encephalitis," Nevropatol. i Psikhiat., [illegible], No. 1, [illegible].

Moscow Stomatological Inst.

MIKHEYEV, V. V.; PROF

PA 149T56

USSR/Medicine - Encephalitis Jan/Feb 49
Brain Diseases

"Encephalitis," Prof V. V. Mikheyev, Moscow Stomatol Inst, 6 pp

"Nevropatol i Psikhiat" Vol XVIII, No 1

Although symptoms of demyelinating encephalitis are usually recognized, cases with disseminated sclerosis may go unrecognized until surgery is necessary. Demyelinating encephalitis is sometimes found to be erroneously diagnosed as cerebral tumor in autopsy examinations. Cites cases to show that correct diagnosis is possible.

149T56

MIKHEYEV, Vladimir Vladimirovich

Psychoses and diseases of the nervous system; textbook. ... izd. ... dlia srednikh med. shkol. Moskva, Medgiz, 1956. (Mic 55-3134)
Collation of the original, as determined from the film: 190 p.

Microfilm Slavic 308 RC

MIKHAEV, Vladimir Vladimirovich.

(with T. A. NEVZOROVA)

Nervous and psychic diseases; textbook for intermediate medical schools. Moskva, Medgiz, 1953. (Mic 55-3667)

Collation of the original, as determined from the film: 324 p.

Microfilm Slavic 424 AC

MIKHEYEV, V.V., professor, zaveduyushchiy; DUKHOVNIKOVA, L.M.

Cerebral insultus and pneumonia; central origin of pneumonia. Klin.med. 31 no.9:56-59 S '53. (MLRA 6:11)

1. Kafedra nervnykh bolezney Moskovskogo meditsinskogo stomatologicheskogo instituta. (Pneumonia) (Brain--Diseases)

MIKHEEV, Vadim Vladimirovich.
(Nervous diseases; textbook for medical) Moskva, Medgiz, 1954. 430 p.

MH

1. Nervous sustem - Diseases.

MIKHEYEV, V.V.

MIKHEYEV, V.V.; SHTIKMEL', A.Kh

Rotatory variation of epileptic seizure. Zhur. nevr. i psikh. 54 no.7:553-558 Jl '54. (MLRA 7:7)

1. Klinika nervnykh bolezney Arkhangel'skogo meditsinskogo instituta i klinika nervnykh bolezney Moskovskogo meditsinskogo stomatologicheskogo instituta.
(EPILEPSY, physiology,
*rotatory variation of epileptic seizure)

MIKHEYEV, V.V.

BOGOLEPOV, N.K.

"Nervous diseases and psychopathology" V.V.Mikheev, T.A.Nevzorova. Reviewed by N.K.Bogolepov. Zhur. nevr. i psikh. 54 no.7:590-592 Jl '54. (MLRA 7:7)

(NERVOUS SYSTEM--DISEASES) (PSYCHIATRY)
(MIKHEEV, V.V.)

MIKHEYEV, V.V.; NEVZOROVA, T.A.

[Nervous and psychic disorders] Nervnye i psikhicheskie bolezni. 2., ispr. izd. Moskva, Medgiz, 1956. 362 p. (MLRA 10:2)
(NERVOUS SYSTEM—DISEASES)

MIKHEYEV, V.V., professor

Cerebral affections in rheumatism. Sov.med. 20 no.11:3-5 N '56.
(MLRA 10:1)

1. Zaveduyushchiy kafedroy nervnykh bolezney Moskovskogo meditsinskogo stomatologicheskogo instituta.

(RHEUMATISM, compl.
brain dis.)
(BRAIN, dis.
caused by rheum.)

MIKHEYEV, V.V.

"Rheumatic encephalitis in children." by M.M.Model', T.P.Simson.
Reviewed by V.V.Mikheev. Zhur.nevr. i psikh. 56 no.11:917-918 N '56.
(RHEUMATIC FEVER) (ENCEPHALITIS) (MLRA 10:2)
(MODEL', M.M.) (SIMSON, T.P.)

MIKHEYEV, V.V., professor

Classification of epileptic seizures. Sov.med. 21 no.5:11-15 My '57. (MLRA 10:7)

1. Iz kafedry nervnykh bolezney i psikhiatrii Moskovskogo meditsinskogo stomatologicheskogo instituta.

(EPILEPSY
classif. of seizures)

MIKHEYEV, V.V.

[Stomatoneurology; neurological factors in clinical stomatology] Stomatonevrologiia; elementy nevrologii v stomatologicheskoi klinike. Moskva, Medgiz, 1958. 262 p. (MIRA 11:9)
(STOMATOLOGY) (NEUROLOGY)

MIKHEYEV, Vadim Vladimirovich

[Nervous diseases] Nervnye bolezni. Moskva, Medgiz, 1958. 493 p. (MIRA 12:2)

(NERVOUS SYSTEM--DISEASES)

MIKHEYEV, V.V., prof. (Moskva)

L. O. Darkshevich, outstanding neuropathologist; on the centenary of his birth. Sov.med. 22 no.6:145-147 Je '58 (MIRA 11:9)
(NEUROLOGY,
contribution of Liveriia A. Darkshevich (Rus))
(PATHOLOGY,
same (Rus))